

# Some Paleogene Mud Pectens of the Genus *Propeamussium* from Alaska and California

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(1 Plate)

## INTRODUCTION

THIS REPORT IS BASED on a study of a collection of Paleogene *Propeamussium* from the Aleutian Islands of the marginal North Pacific Ocean. The pectinids were collected from the northern part of Adak Island (Lat. 176° 54' W; Long. 51° 54' N) by D. W. Scholl and H. G. Greene of the U. S. Geological Survey in 1968. The material is from a rock unit once thought to be of Paleozoic age based upon identification of supposed specimens of the plant *Annularia* (COATS, 1956). Preliminary study

of the small mud pectens and associated marine microfossils clearly indicated a Tertiary age (SCHOLL *et al.*, 1969). Initial identification of these specimens as *Propeamussium* cf. *P. stanfordensis* (ARNOLD) led to a tentative middle Tertiary age assignment inasmuch as this species was originally recorded from rocks of Miocene age at the type locality (ARNOLD, 1906). Subsequent discovery of Eocene Foraminifera and fish remains in additional samples from Adak Island by R. L. PIERCE (*in* SCHOLL *et al.*, 1969) called for re-examination of the stratigraphic occurrence of *P. stanfordensis*. And indeed, recent geologic mapping (DIBBLEE, 1966; PAMPEYAN, 1969) of the central California area from which

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## Plate Explanation

*Propeamussium* (*Propeamussium*) *leohertleini* ADDICOTT, spec. nov.

(All figured specimens are from USGS loc. M3892)

Figure 1. USNM 646439. Left valve of deformed articulated specimen with part of the right anterior ear exposed. Height 11.8 mm; length 12.8 mm

Figure 2. USNM 646440. Right valve. Height 11 mm; length 10.5 mm

Figure 7. USNM 646441. Immature left? valve. Height (incomplete) 5.4 mm; length 5.6 mm

Figure 9. USNM 646442. Exterior of left valve. Height 8.1 mm; length (incomplete) 7 mm

Figure 12. USNM 646443. Left? valve. Height 10.6 mm; length 10.9 mm

Figure 13. USNM 646444. Holotype, right valve. Height 10.7 mm; length 10.4 mm. Fragment of left valve; hinge measures 5 mm in length

*Propeamussium* (*Parvamussium*) *stanfordensis* (ARNOLD)

Figure 3. USNM 646445. USGS loc. 5749. Right valve (above) 10.4 mm in height and 10.1 mm in length; left valve (below) 13.6 mm in height and 12.5 mm in length

Figure 5. USNM 646446. USGS loc. M1492. Left valve (above) 7.8 mm in height and 8 mm in length; right valve (below) 9 mm in height and 8.1 mm in length

Figure 8. USNM 646447. USGS loc. 5749. Right valve (above) 9 mm in height and 8.6 mm in width. Incomplete valve (below) 10.7 mm in width

Figure 10. USNM 646448. USGS loc. 5749. Right valve. Height 10.9 mm; length 9.6 mm

*Propeamussium* spec. nov. ?

Figure 4. USNM 646449. USGS loc. M4108. Height (incomplete) 10.8 mm; length 12.8 mm

*Propeamussium* (*Propeamussium*) *interradiatum* (GABB)

Figure 6. USNM 646450. USGS loc. 5742. Right valve. Height 16 mm; length 17.1 mm

Figure 11. USNM 646451. USGS loc. 5742. Incomplete right valve. Height 16.3 mm



Figure 1



Figure 2



Figure 3



Figure 4

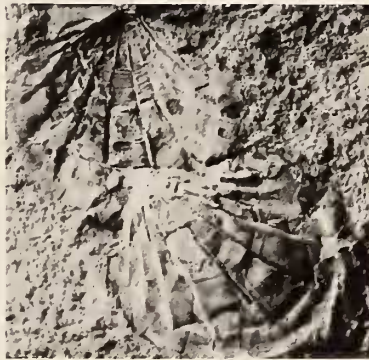


Figure 5

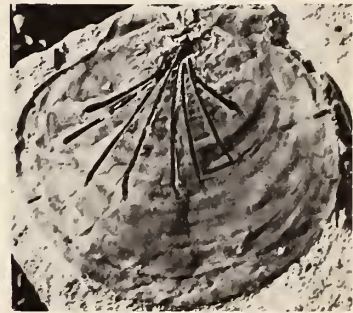


Figure 6



Figure 7



Figure 8



Figure 9



Figure 10



Figure 11



Figure 12

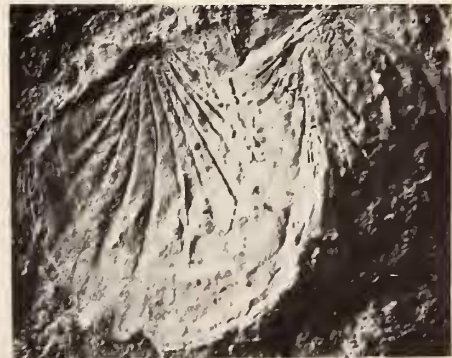


Figure 13





this species was originally collected (Lat. 37°30' N) indicates that the type material came from rocks of Eocene rather than middle Miocene age.

The recently discovered material from the Aleutian chain includes three different mud pectens – two species of *Propeamussium* and a very poorly preserved, specifically indeterminate *Delectopecten*. This is the first Tertiary record of *Propeamussium* (*Propeamussium*) from Alaska, the few previous Alaskan records of this genus having been reclassified as *Polynemamussium* by MACNEIL (1967) [*Polynemamussium* = *Propeamussium* (*Parvamussium*) of GRAU (1959)]. It is also the earliest Tertiary record of the genus from the rim of the North Pacific, the oldest previously recorded occurrence being from rocks of late Oligocene age in Kamchatka – *Propeamussium* cf. *P. pillarensis* (SLODKEWITSCH, 1938).

The purpose of this note is to describe the early Tertiary species from Alaska and to clarify the stratigraphic and chronologic occurrence of *Propeamussium stanfordensis* in California. The *Propeamussium* from exposures on Adak Island is indeed very similar to *P. stanfordensis* (ARNOLD), as previously indicated (SCHOLL *et al.*, 1969). It differs, however, in the configuration of the right anterior ear and in minor sculptural detail. This taxon is here named *P. leohertleini*. Another *Propeamussium* represented by a single poorly preserved specimen from a stratigraphically higher locality on Adak likewise seems to be undescribed, but is not named here. Generic classification of species treated herein is based upon GRAU (1959).

## SYSTEMATIC PALEONTOLOGY

*Propeamussium* DE GREGORIO, 1884

(*Propeamussium*) DE GREGORIO,  
1884

*Propeamussium* (*Propeamussium*) *leohertleini* ADDICOTT,  
spec. nov.

(Figures 1, 2, 7, 9, 12, 13)

1969. *Propeamussium* cf. *P. stanfordensis* (ARNOLD). SCHOLL, GREENE, ADDICOTT, and others, Amer. Assoc. Petroleum Geologists Bull. 53: 459

**Description:** Small, thin-shelled with equal auricles. Valves circular, equidimensional with similar external sculpture. Surface of right valve almost smooth; extremely fine pattern of faint concentric undulations discernible on some specimens. Right anterior auricle with weak byssal notch reflected by curvature of growth lines.

Interior with 10 slightly curved ribs extending nearly  $\frac{3}{4}$  of distance toward the margin. Left valve with almost equally faint but more strongly delineated sculpture of regular concentric growth lines. Interior with 10 ribs slightly curved extending nearly  $\frac{3}{4}$  of distance from beak to margin.

**Type:** U. S. National Museum 646444, a right valve.

**Dimensions of holotype:** height 10.7 mm, length 10.4 mm

**Type Locality:** USGS Cenozoic locality M3892. About  $\frac{1}{4}$  mile northwest of Mitchell Field air strip on point projecting into east shore of Lake Andrews, northern part of Adak Island, Aleutian Islands, Alaska. Andrew Lake Formation of SCHOLL *et al.* (1970), middle or late Eocene.

**Discussion:** *Propeamussium leohertleini* occurs in the lower part of the Andrew Lake Formation at localities about 200 m (M3891) and 350 m (M3892) above the base. It is associated with a small assemblage of benthonic foraminifers considered by R. L. PIERCE (*in* SCHOLL *et al.*, 1970) to be provincially of late Eocene age [Narizian Stage of MALLORY (1959)].

Seven of the 16 specimens from the type locality have 10 internal ribs; the remainder from this locality and from nearby M3891 are incompletely preserved. Many of the latter are crushed, articulated valves on which the internal ribs are intermeshed and, in some cases, deformed (Figure 1). The delicate surface sculpture of concentric growth lines and undulations is discernible on only a few of the specimens; it appears to be crisper on the left valves. Clear-cut radial sculpture was not detected on any of the specimens.

As previously indicated (SCHOLL *et al.*, 1969) this species is very similar to *Propeamussium stanfordensis* (ARNOLD), a late Eocene species from central California (Figures 3, 5, 8, 10). It differs from that species, and from the similar early Eocene species *P. mideocenicum* VOKES, 1939 from California, principally in lacking a well-defined byssal notch. The left valve of *P. mideocenicum* can be differentiated from this species by its prominent, sharp external ribs (12 on two of the syntypes: UCMP 15584 and 15586). Further, but minor, differences from the California species are the relatively shorter internal ribs and the prominent, but very fine, growth striae of *P. leohertleini*.

*Propeamussium interradiatum* (GABB, 1869, p. 199; pl. 33, figs. 98, 98a), the common Eocene species of this genus from California, differs from *P. leohertleini* in having a relatively smooth exterior and fewer internal ribs – 8 rather than 10 (Figures 6, 11).

This species is named for Leo G. Hertlein, Curator Emeritus at the California Academy of Sciences, in recognition of his contributions to the study of Tertiary and Quaternary monomyarian pelecypods.

**Occurrence:** Andrew Lake Formation (middle or upper Eocene), Adak Island, Aleutian Islands, Alaska. USGS Cenozoic localities M3891, M3892, M4108.

*Propeamussium* spec. nov.?

(Figure 4)

A single specimen of a *Propeamussium* from float collected near the top of the Andrew Lake Formation (SCHOLL *et al.*, 1970) on the northern part of Adak Island, Aleutian Islands, Alaska, appears to be distinct from known species of Tertiary age along the margins of the North Pacific. Although represented by a single incomplete valve, the sculpture, strong internal ribbing, and auricles (incompletely preserved) indicate reference to *Propeamussium*.

*Propeamussium* spec. nov.? is distinguished from *P. leohertleini* spec. nov., which also occurs in the Andrew Lake Formation, by its fewer radial ribs – 8 rather than 10 – and the fact that these ribs extend almost to the edge of the disk.

The length of the internal ribs, extending almost to the margin, and the prominent concentric microsculpture likewise distinguish this specimen from the common Eocene species *Propeamussium interradiatum* (GABB) from California.

**Occurrence:** Float block from northwest shore of Clam Lagoon, Andrew Lake Formation (middle or upper Eocene), Adak Island, Aleutian Islands, Alaska. USGS Cenozoic loc. M4108.

(*Parvamussium*) SACCO, 1897

*Propeamussium* (*Parvamussium*) *stanfordensis* (ARNOLD)

(Figures 3, 5, 8, 10)

1906. *Pecten* (*Propeamussium*) *stanfordensis* ARNOLD, U.S. Geol. Survey Prof. Paper 47: 91–92; pl. 23, fig. 4

1909. *Pecten* (*Propeamussium*) *stanfordensis* ARNOLD. BRANNER, NEWSOME, and ARNOLD, U.S. Geol. Atlas, Santa Cruz Folio [no. 163]: illust. II, fig. 51

?1939. *Propeamussium mideocenicum* VOKES, New York Acad. Sci. Annals 38: 55–56, in part; pl. 3, fig. 4 (not figs. 2 and 3)

**Type:** Stanford Univ. Paleontol. Type Coll., no. 12, a left and a right valve.

**Type Locality:** "...buff colored Miocene [Eocene] shale in a small ravine on the Burke [now Webb] ranch one-third mile south [west] of Los Trancos Creek near Stanford University, San Mateo County" (ARNOLD, 1906, p. 92). A more detailed description (KEEN & BENTSON, 1944) fixes this locality in a small east-flowing tributary to Los Trancos Creek, about  $\frac{1}{2}$  mile west of Felt Lake [in rocks of Eocene age mapped as Butano(?) Sandstone by DIBBLEE (1966) and PAMPEYAN (1969)].

**Discussion:** *Propeamussium stanfordensis* is reconsidered here in light of the revision of its stratigraphic occurrence – from middle Miocene to upper Eocene – and the availability of additional material from near the type locality for figuring. One of the specimens figured herein, a virtual topotype (Figure 5) has a much better preserved external surface showing relatively strong, regularly spaced concentric undulations.

ARNOLD (1906, p. 92) originally classified the stratigraphic occurrence of this species as middle Miocene, apparently believing the light-colored shale exposure from which it was collected to be part of the Monterey Shale. Consequently, subsequent treatments of Tertiary *Propeamussium* (SLODKEWITSCH, 1938; WEAVER, 1942) have considered species, and phylogenies, in the context of a Neogene stratigraphic occurrence of this taxon. A doubtful identification of this species from lower Tertiary rocks in the Aleutian Islands (SCHOLL *et al.*, 1969) is now believed to represent a different species, described herein as *P. leohertleini*. The occurrence of a similar species in lower Tertiary strata led to re-examination of the type locality of *P. stanfordensis* near Stanford University in central California. It was found that the type locality is in an area of upper Eocene rather than middle Miocene rocks, according to recent geologic mapping and related micropaleontologic studies.

Two of the specimens of *Propeamussium stanfordensis* figured in this report (Figure 5) can be regarded as topotypes. They are from a locality on the north wall of the same drainage from which the holotype was collected by Ralph Arnold, possibly on strike from his locality. They occur with a diverse foraminiferal assemblage of late Eocene Narizian age according to M. C. Isaelsky (in written communication to E. H. Pampeyan, April 16, 1963; USGS microfossil locality Mf707). The occurrence is about 45 m stratigraphically below the base of middle Miocene rocks in a unit mapped by DIBBLEE (1966) and by PAMPEYAN (1969) as Butano(?) Sandstone and by PAGE & TABOR (1967) as unnamed Eocene rocks.